WHAT IS CLAIMED IS:

1. A method of olfactory pattern classification comprising the steps of:

sensing odorants using a plurality of odor receptors;

converting output of said sensing step to binary data;

inputting binary data from said converting step to a spiking neural network;

training said spiking neural network to learn most prevalent combination of odor receptors; and

associating said combination of odor receptors from said training step with an output neuron.

2. The method of olfactory pattern classification of claim 1 further comprising the step of converting said binary data into spike trains comprising an adder/comparator combination having an input of zero representing a lack of odorant stimulus and an input of one representing an odorant stimulus.

3. The method of olfactory pattern classification of claim 2 wherein said training step further comprises the steps of:

summing active inputs to a counter for every clock cycle of said adder/comparator combination;

adding one to every clock cycle of said adder/comparator for every zero input;

posting a spike to a spike bus every time said counter reaches a specified threshold; and

resetting said counter to zero after said posting step.

4. The method of olfactory pattern classification of claim 3 wherein said summing step further comprises summing active inputs to a counter for every 20KHz clock cycle of said adder/comparator combination.

5. The method of olfactory pattern classification of claim 1 wherein said sensing step further comprises sensing odorants using a plurality of CHEMFET odor receptors.

6. The method of olfactory pattern classification of claim 1 wherein said sensing step further comprises sensing odorants using a plurality of IONFET odor receptors.

7. The method of olfactory pattern classification of claim 1 wherein said training step further comprises the steps of:

receiving an input signal from an olfactory receptor;

summing said input from said receiving step;

adding one to a clock cycle for every input signal from said receiving step;
comparing values from said summing step and said adding step and comparing to a preselected threshold value;
inputting an above threshold value from said summing step to a spike bus;
determining whether value from said inputting step matches data on a synapse listing;
adding values from said determining step that do not match data on said synapse listing to a noise counter;
adding values from said determining step that do match data on said synapse list to a spike counter; and
outputting a signal associated with said spike counter after inputs to said spike counter reach a preselected threshold value.

8. The method of olfactory pattern classification of claim 7 wherein said inputting step further comprises the steps of:

providing a spike bus including synchronization logic;
connecting input signal from said receiving step to said spike bus using a priority encoder;
posting address of said input signal on said spike bus using said priority encoder; and
connecting neuron modules in parallel to said spike bus by a potentiated synapse list.

9. The method of olfactory pattern classification of claim 7 wherein said determining step further comprises the step of determining whether value from said inputting step matches data on a synapse listing containing odor receptor signatures.

10. A method of olfactory pattern classification comprising the steps of:

sensing odorants using a plurality of odor receptors;
first converting output of said sensing step to binary data;
second converting said binary data into spike trains comprising an adder/comparator combination having an input of zero representing a lack of odorant stimulus and an input of one representing an odorant stimulus;
summing active inputs to a counter for every clock cycle of said adder/comparator combination;
adding one to every clock cycle of said adder/comparator for every zero input;
posting a spike to a spike bus every time said counter reaches a specified threshold;
resetting said counter to zero after said posting step;

training said spiking neural network to learn which combination of odor receptors is most prevelant; and

associating a set of most prevelant ordor receptors with an output neuron.

11. An olfactory pattern classification device comprising:

a plurality of odor receptors for sensing odorants;

means for converting output of said odor receptors to binary data;

a spiking neural network for receiving said binary data comprising:

a plurality of potentiated synapses, wherein the weight of an off synapse is zero and the weight of an on synapse is one;

a counter for adding positive weights from said potentiated synapses;

a threshold comparator for determining when said counter has reached a preselected threshold value;

a training program for training said spiking neural network to learn which combination of odor receptors is most prevelant; and

a specified output neuron specified by which set of odor receptors are most prevelant

12. The olfactory pattern classification device of claim 11 wherein said training program further comprises:

a spike bus providing synchronization logic;

a priority encoder for connecting an input signal from said spike bus and for posting address of said input signal on said spike bus; and

a potentiated synapse list for connecting neuron modules in parallel to said spike bus.

13. The olfactory pattern classification device of claim 12 wherein said potentiated synapse list further comprises a potentiated synapse list comprising odor receptor signatures.